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Gumene cevi in cevni priključki za pretakanje letalskih goriv - Specifikacija

Rubber hoses and hose assemblies for aviation fuel handling - Specification

Gummischläuche und -schlauchleitungen für die Flugzeugbetankung - Anforderungen

Tuyaux et flexibles en caoutchouc pour transfert de carburant pour aviation - Spécification

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Rubber hoses and hose assemblies for aviation fuel handling - Specification

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Foreword

This document (EN 1361:2004) has been prepared by Technical Committee CEN/TC 218 “Rubber and plastics hoses and hose assemblies”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

This document supersedes EN 1361:1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies the dimensions, construction and requirements for four types of hoses and hose assemblies for use in all operations associated with the ground fuelling and de-fuelling of aircraft.

All four types of hose are designed for:

a) use with petroleum fuels, having an aromatic hydrocarbon content not exceeding 30 % by volume;

b) operation within the temperature range of –30 °C to +65 °C and are to be undamaged by climatic conditions of -40 °C to +70 °C when stored in static conditions;

c) operating up to 20 bar maximum working pressure, including surges of pressure which the hose can be subjected to in service.

NOTE 1 Type C hoses are intended for general pressure application on all vehicles used for into – plane fuelling. It can also be used for vehicle/rail car loading and discharge where excessive vacuum does not occur.

NOTE 2 Type F hoses can be used for into-plane delivery applications on vehicles that are also used for de-fuelling at high flow rates, where Type C hoses are not suitable.

NOTE 3 Types E & F hoses can also be used for vehicle/rail, car loading and discharge, for trailer to fueller transfer and for elevation platform supply (riser) to provide greater kink resistance.

2 Normative references

The following referenced documents are indispensable for theapplication of this document. For dated references, only the edition cited applies. For undated references, the latest editionof the referenced document (including any amendments) applies.

EN 27326 *Rubber and plastics hoses — Assessment of ozone resistance under static conditions (ISO 7326:1991)*

EN 28033, *Rubber and plastics hose — Determination of adhesion between components (ISO 8033:1991)*

EN ISO 1402, *Rubber and plastics hoses and hose assemblies - Hydrostatic testing (ISO 1402:1994)*

EN ISO 4671, *Rubber and plastics hose and hose assemblies - Methods of measurement of dimensions (ISO 4671:1999)*

EN ISO 4672, *Rubber and plastics hoses - Sub-ambient temperature flexibility tests (ISO 4672:1997)*

EN ISO 6246, *Petroleum products - Gum content of light and middle distillate fuels - Jet evaporation method (ISO 6246:1995)*

EN ISO 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance (ISO 8031:1993)*

EN ISO 8330, *Rubber and plastics hoses and hose assemblies - Vocabulary (ISO 8330:1998)*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188, *Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests*

ISO 1817:1999, *Rubber, vulcanized — Determination of the effect of liquids*

ISO 4649, *Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8330 and the following apply.

3.1
electrically bonded hose/hose assembly
hose/hose assembly that uses a metallic wire connection to conduct static electricity

3.2
electrically conductive hose/hose assembly
hose/hose assembly that is capable of conducting static electrical charges, using a conductive rubber layer, without the use of a metallic wire

4 Classification

Hoses for this application are classified into four types and two grades according to their construction and electrical properties.

Type	Grade	Construction
B	M	Electrically bonded, incorporating at least two low resistance electrically bonding wires and a conductive cover compound
C	Ω	Electrically conductive, incorporating a conductive cover compound
E	M	Electrically bonded, incorporating at least one metallic wire helix, with enhanced de-fuelling capability, at least two low-resistance electrically conductive wires and a conductive cover compound
F	Ω	Electrically conductive, incorporating at least one non-electrically conductive non-metallic helix and conductive cover compound

5 Service reeling diameter

Hoses shall be designed for operation on equipment fitted with hose reels of the diameters given in Table 1.

NOTE These hoses remain substantially circular in cross section when reeled on drums (see Table 1) and should not be confused with hoses of the collapsible type that are intended to be reeled flat.

Table 1 — Service reeling diameters

Nominal bore	Minimum external diameter of reeling drum used in service mm
19	225
25	300
32	375
38	450
50	550
63	600
75	600
76	600
100	900
101	900

6 Materials & Construction

6.1 Hoses

If a hose is built and vulcanized on a mandrel, particulate type release agents shall not be used. A hose shall be uniform in quality, free from porosity, air holes, foreign inclusions and other defects. A hose shall comprise:

A lining of synthetic rubber resistant to petroleum fuel.

A reinforcement of layers of woven, braided or spiral wound textile material.

Type E shall incorporate one or more metallic wire helix or helices.

Type F shall incorporate one or more non-metallic helix or helices.

A cover of synthetic rubber shall be conductive, resistant to abrasion, outdoor exposure and petroleum fuel.

Types B & E shall also incorporate low resistance electrically conductive wires to enable the hoses to be electrically bonded to the couplings when manufacturing a hose assembly.

NOTE A hose cover may have a shallow cloth marked finish.

6.2 Hose assemblies

In order to produce the required electrical properties, the method of attachment of the couplings shall be in accordance with Clause 10.

7 Dimensions

7.1 Internal diameters and tolerances

When measured in accordance with EN ISO 4671 the internal diameters and tolerances shall comply with the values given in Table 2.

Table 2 — Nominal bore, internal diameters and tolerances

Nominal bore	Internal diameter mm	Tolerance mm
19	19,0	± 0,8
25	25,0	
32	32,0	
38	38,0	
50	50,0	± 1,2
63	63,0	
75	75,0	
76	76,0	
100	100,0	± 1,6
101	101,5	

7.2 Thickness

When measured in accordance with EN ISO 4671 the thickness of the lining for hoses of all internal diameters shall not be less than 1,6 mm.

For hoses of nominal bore less than 50, the thickness of the cover shall not be less than 1,6 mm. For hoses of nominal bore 50 and above, the thickness of the cover shall not be less than 2,0 mm.

7.3 Concentricity

When determined in accordance with EN ISO 4671, the concentricity, based on a total indicator reading between the internal diameter and the outside surface of the cover, shall not exceed 1 mm.

7.4 Tolerance on length

The tolerance on the measured length of hose or hose assembly shall be ± 1 %.

7.5 Mass per unit length of hose

The maximum mass per unit length shall comply with the values given in Table 3.

Table 3 — Mass per unit length of hoses

Nominal bore	Type B and type C Kg/m	Type E and type F Kg/m
19	0,9	1,1
25	1,1	1,5
32	1,4	1,9
38	1,7	2,2
50	2,7	3,0
63	3,5	4,0
75	4,0	4,7
76	4,0	4,7
100	6,5	7,5
101	6,5	7,5

8 Physical properties

8.1 Rubber compounds

The physical properties of the rubber compounds used for the lining and cover shall comply with the values given in Table 4, when tested by the methods listed in Table 4. Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets, except for cold embrittlement and abrasion resistance tests which shall be carried out on moulded test pieces vulcanized to the same state as the hose.

Table 4 — Physical properties of rubber compounds

Property	Unit	Requirement		Method of test
		Lining	Cover	
Tensile strength, min.	MPa	7,0	7,0	ISO 37 (dumb-bell test pieces)
Elongation at break, min.	%	250	300	ISO 37 (dumb-bell test pieces)
Swelling in fuel, max.	%	50	75	8.2 of ISO 1817:1999 (48 h at 40 °C in liquid B)
Fuel-soluble matter, max.	%	4,0	Not	Annex A
Cold embrittlement		No cracking	No cracking	Annex B
Abrasion resistance, max	mm^3	Not applicable	140	Method A of ISO 4649
Ageing	%			ISO 188 (7 days at 70 °C) (air-oven method)
Tensile strength change, max.		± 30	± 30	
Elongation at break change, max.		± 30	± 30	

9 Finished hose & hose assemblies

The physical properties of the finished hose & hose assemblies shall comply with the values given in Table 5, when tested by the methods listed in Table 5.